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In-Stent Dissection Causes No Flow During Percutaneous Coronary Intervention

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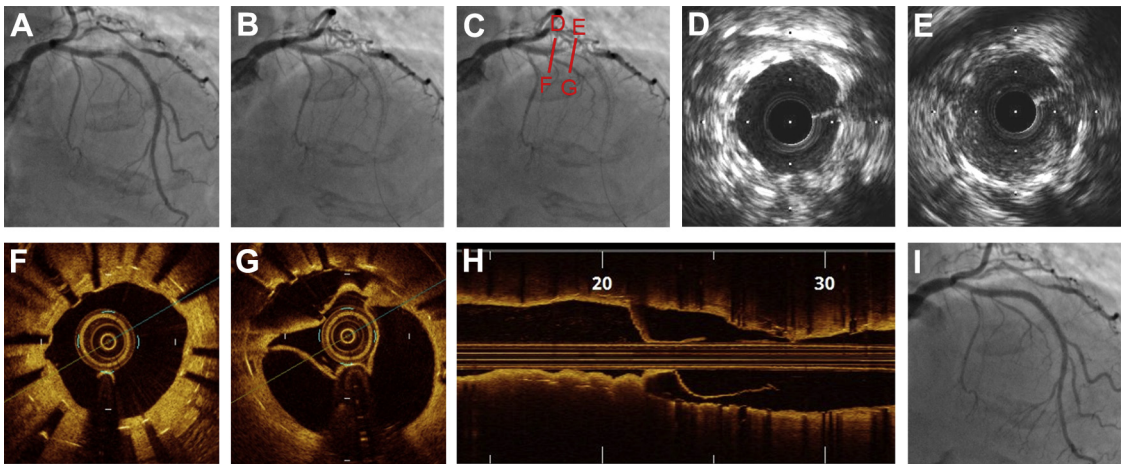
A 71-year-old woman with chest pain consulted us 1 week after an emergent operation for a small intestine perforation. She had previously undergone percutaneous coronary intervention (PCI) twice for the left anterior descending artery. The first was performed with a bare-metal stent 5 years earlier, and the second was performed for in-stent restenosis (ISR) treated with a biolimus A9-eluting stent. Angiography revealed 99% restenosis at the same location as that of the previous ISR (**Figure 1A**, Online Video 1); therefore, PCI was performed. Immediately after initial dilation using a semicompliant 2.0-mm balloon, the coronary flow abruptly disappeared (**Figure 1B**, Online Video 2). The slow-flow/no-reflow phenomenon is associated with myocardial injury, less favorable clinical outcomes, and generally with microthromboemboli. Despite standard treatments such as manual thrombus aspiration and intracoronary vasodilator administration, we could not reestablish coronary flow. To determine the mechanism underlying the no flow, we performed intravascular ultrasound (IVUS), which did not reveal the cause of the no flow (**Figures 1D and 1E**, Online Video 3). We then

FIGURE 1 Angiography, IVUS, and OCT Images



(A) Angiography before percutaneous coronary intervention (Online Video 1). **(B)** No flow after initial dilation (Online Video 2). **(C)** The locations of IVUS/OCT images. **(D, E)** IVUS showing the locations in **C** (Online Video 3). **(F, G)** OCT cross-sectional images showing the locations in **C** (Online Video 4). **(H)** OCT longitudinal image. **(I)** Final angiography (Online Video 5). IVUS = intravascular ultrasound; OCT = optical coherence tomography.

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performed optical coherence tomography, which clearly showed a dissection within the previous stent (**Figures 1F to 1H**, Online Video 4). Subsequent dilation by a cutting balloon re-established coronary flow (**Figure 1I**, Online Video 5). We speculated that neoatherosclerosis within the stent caused the restenosis, and the initial dilation induced a dissection that caused occlusion and resulted in no flow. This report is the first to show that in-stent dissection can cause no flow during PCI and that optical coherence tomography would uncover the mechanism.

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APPENDIX For supplemental videos, please see the online version of this article.